

SPECIAL AIRWORTHINESS INFORMATION BULLETIN

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This is information only. Recommendations aren't mandatory.

Introduction

This Special Airworthiness Information Bulletin alerts you, owners and operators of **Bell Helicopter Textron, Inc. (Bell) Model 205A, 205A-1, 205B, 212, and 412 series helicopters**, of information concerning the tail rotor blades. The tail rotor blade part numbers are 204-010-750-all.

Background

On August 19th, 2004, a Bell Model 412 pilot lost tail rotor control that resulted in a forced water landing. The tail rotor and a significant portion of the tail rotor gearbox have not been recovered from the Gulf of Mexico. Fortunately, no one was hurt. The same operator had a similar accident in June 1999. A section of the tail rotor blade departed in-flight resulting in loss of control of the helicopter. The pilot got the helicopter to "level out" before setting down into the water. The blade failed due to a cracked spar that originated from a corrosion pit on the stainless steel leading edge. The same tail rotor blade is also installed on the Bell 205A, 205A-1, 205B, and 212 helicopters.

There have been seven reported failures on tail rotor blades installed on Bell Model 212 and 412 helicopters (two on the 212 and five on the 412). Three of them were in-flight. One occurred on July 18th, 2002, in Goose Bay, Canada and resulted in two fatalities and two serious injuries. The initiation site was reported to be a gouge .008 inches deep by .060 inches long in the blade skin. The other in-flight failure occurred in Thailand in 1997. All three of the in-flight failures involved the 412

series. Inspections found cracks ranging from 6.0 inches in length and greater in the other four failures. The cracks initiated from corrosion, scratches, and other damage.

The preliminary report from the Canadian accident investigation indicated the operator was not using any specific inspection method required to detect the small-scale damage required by the maintenance manual. Inquiries to other Bell model 412 users confirmed that other operators were also not accomplishing a specific inspection on the tail rotor blades.

Five failures initiated between blade stations 30 to 33.5. One failure initiated at blade station 21.9 and one at 27.6. The blade assembly part numbers were 212-010-750-009, -105 and -107. The failed tail rotor blades had accumulated from 279 to 4,643 hours time-in-service (TIS). The tail rotor blades have a component life of 5,000 hours TIS. A visual inspection is currently required either daily or every 25 hours TIS depending on the maintenance program.

Inspections found the tail rotor blade to be susceptible to impact damage caused by an impingement from outside sources (gravel, stone, hail, etc.) The impact damage serves as a fatigue crack initiator with subsequent crack growth until the blade fails from overload on the remaining intact structure. It is also known that corrosion or corrosion pits have served as a crack initiator.

Bell released Operations Safety Notice (OSN) 412-02-25 dated August 27, 2002 addressing the importance of accomplishing a complete inspection of the tail rotor blades at the

specified intervals for the model 412 helicopters. Bell also released the same notice for the model 205, 205B, and 212 helicopters. We have reviewed the OSN's and concur with the recommendations. For copies of the OSN, contact Bell Helicopter Textron, Inc., P.O. Box 482, Fort Worth, TX 76101; phone: (817) 280-3391; fax: (817) 280-6466.

Recommendation

We recommend the following maintenance procedures:

MODEL 412, 412EP, AND 412CF HELICOPTERS:

1. Before each start of the helicopter engines:

- Visually check both sides of each tail rotor blade for a crack. Pay particular attention in the area located 10 to 25 inches from the tip. An owner/operator holding at least a private pilot certificate may perform this visual check.

2. At intervals not to exceed 25 hours time-in-service (TIS) or 15 days, whichever occurs first:

- Clean each tail rotor blade using a mild detergent and water to remove soot and grime. Using a 2 to 3-power magnifying glass and a good source of light, visually inspect each blade for a crack, any corrosion (blistering, peeling, flaking, bubbling, or cracked paint), or any discrete source damage (a nick, scratch, sharp dent, or non-sharp dent). Pay particular attention in the area located 10 to 25 inches from the tip. Also, inspect for a bond separation anywhere on the blade.
- If any indication of corrosion is detected, verify corrosion damage by removing the paint from the affected area

and perform a visual inspection using a 5 to 10-power magnifying glass.

3. Before further flight:

- Replace any cracked blade with an airworthy blade.
- Repair any blade with corrosion within the damage limits and repair criteria. The damage limits and repair criteria are specified in the applicable maintenance manuals and component repair and overhaul manuals. Polish out using aluminum wool or very fine abrasive pad (400-grit or finer, paper or cloth) on all aluminum surfaces, and use very fine abrasive pad on the stainless steel leading edge spar. A 180-grit or finer abrasive pad may be used if followed by polishing with aluminum wool or very fine grade abrasive pad for the aluminum grip plates and doublers, and with very fine abrasive pad on the spar. Repair depth on aluminum must be twice the depth of the visible corrosion. Hand polish in a span wise direction. On all surfaces where corrosion has been polished out, apply alcohol phosphoric cleaner using a clean cloth or brush. Rub solution briskly into surface for approximately 40 to 60 seconds. Carefully check for pits or a crack with a 10-power magnifying glass following clean up. No pitting is permissible.
- Replace any blade with any corrosion or any nick, scratch, sharp dent, or non-sharp dent that exceeds any damage limit or repair criteria with an airworthy blade.
- Replace any blade with any bond separation with an airworthy blade.
- If tail rotor vibration levels increase dramatically, land as soon as possible and inspect both sides of each tail rotor blade for a crack.

***MODEL 205A, 205A-1, 205B, AND 212
HELICOPTERS:***

- Accomplish a complete inspection of the tail rotor blades at the specified intervals. The blades must be clean in order to perform an adequate visual inspection. The inspection intervals, damage limits, and repair criteria are specified in the applicable maintenance manuals and component repair and overhaul manuals.

For Further Information Contact

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